ISI 6th grade curriculum map
Earth Science

STC: Space Systems Exploration

Lessoon	Focus Question	Description	Objective(s)	number of classes	Vocabulary	IN #	Standard Text	Cross Cutting Concept(s)	Practices	Notes
1.1	How do the sun, earth, and moon interact?	Students develop a model of the Sun-Earth-Moon system and use it to study how the relative movements of these bodies create daily, monthly, and annual cycles.	- Analyze scale properties - Describe the cyclic patterns caused by Earth and Moon orbits - Calculate time in terms of distance traveled around the Sun and revolutions of the Moon	2	Axix, orbit, diameter, revolution, rotation	6.EES.2	- Design models to describe how Earth's rotation, revolution, tilt, and interaction with the sun and moon cause seasons, tides, changes in daylight hours, eclipses, and phases of the moon.	Patterns, Systems and system models	Developing and using models, Mathematical and computational thinking	
2.1	How does the moon get it's light? What are the phases of the moon and what is going on (sun-moon-earth) during those phases?	Students use the sun-moon-earth system to study how the sun illuminates the moon as it orbits the Earth. Students also explore the various phases of the moon.	-Construct and use a model to understand how the moon reflects sunlight as it orbits the earth. -Use a model to explain how the relative positions of the sun, moon and earth change the moon's appearance. -Analyze the moon's appearance in relation to the cyclic pattern of lunar phases. - Identify and name the phases of the moon. - Use models to visualize why only one side of the moon ever faces the earth.	2-3	Illuminate, lunar phases, waxing gibbous, waning gibbous, plane	6.EES.2	- Design models to describe how Earth's rotation, revolution, tilt, and interaction with the sun and moon cause seasons, tides, changes in daylight hours, eclipses, and phases of the moon.	Patterns, Systems and system models, Cause and effect, Connection to nature of science	Developing and using models, Engaging in argument from evidence	
3.1	How can you use data to find patterns in tideal and lunar change?	Students analyze tide chart data to detect patterns in accurence and amplitude of high and low tides. They compare this data to moonrise and moonset times. Students will also construct graphs to help visulaize the data.	- Analyze data tables to detect patterns in tidal and lunar data. - Apply appropriate graphing techniques to answer questions about tidal and lunar data.	1-1.5	Datum, tide	6.EES.2	- Design models to describe how Earth's rotation, revolution, tilt, and interaction with the sun and moon cause seasons, tides, changes in daylight hours, eclipses, and phases of the moon.	Patterns, Systems and system models, Cause and effect, Connection to nature of science	Developing and using models, Analyzing and interpreting data	

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3.2	How do the moon and sun affect tides on Earth?	Students read about how the moon and sun affect tides here on earth. They develop and build a model to demonstrate these effects in different situations.	- Develop a model to represent the Sun-Moon-Earth system's effects on tide. - Use a model to understand the influence of the sun and moon on tides.	1		6.EES.2	- Design models to describe how Earth's rotation, revolution, tilt, and interaction with the sun and moon cause seasons, tides, changes in daylight hours, eclipses, and phases of the moon.	Patterns, Systems and system models, Cause and effect, Connection to nature of science	Developing and using models, Analyzing and interpreting data	
4.1	What are solar and lunar eclipses?	Students use a small flashlight and sphere to model solar and lunar eclipses.	- Use the model of the Sun-Moon-Earth system to analyze the patterns of shadows during eclipses.	1-1.5	Solar eclipse, lunar eclipse, antumbra, umbra, penumbra, annular eclipse, total solar eclipse, total lunar eclipse, partial solar eclipse, partial lunar eclipse	6.EES.2	- Design models to describe how Earth's rotation, revolution, tilt, and interaction with the sun and moon cause seasons, tides, changes in daylight hours, eclipses, and phases of the moon.	Patterns, Systems and system models, Cause and effect, Connection to nature of science	Developing and using models, Analyzing and interpreting data	
4.2	How are different eclipses formed?	Students examine a table of eclipse data and discuss the rarity of eclipses. They use a model to show how the sun-moon-earth can cause different types of eclipses.	- Examine the frequency of eclipses. - Use the sun-moon-earth system to analyze the patterns of shadows during eclipses.	1-1.5		6.EES.2	- Design models to describe how Earth's rotation, revolution, tilt, and interaction with the sun and moon cause seasons, tides, changes in daylight hours, eclipses, and phases of the moon.	Patterns, Systems and system models, Cause and effect, Connection to nature of science	Developing and using models, Analyzing and interpreting data	

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5.1	What causes the seasons on Earth?	Students use a sun-earth-moon board model to examine winter and summer shadows. They use their observations to answer questions about Earth's seasons.	- Construct and use a model of Earth's orbit around the sun to describe the cyclic patterns of the seasons. - Use a model to investigate the effect Earth's tilted axis has on the amount of solar radiation hitting the Earth during different times of the year.	2		6.EES.2	- Design models to describe how Earth's rotation, revolution, tilt, and interaction with the sun and moon cause seasons, tides, changes in daylight hours, eclipses, and phases of the moon.	Patterns, Systems and system models, Cause and effect, Connection to nature of science	Developing and using models	
6.1	How do you make a scaled drawing or model?	Students use planetary orbital data to decide on scale factors for their model of the solar system and make calculations for their model based on their chosen scale factor.	- Determine an appropriate scale factor to make a model of the solar system. - Apply a scale factor to the solar system data.	1	Aphelion, perihelion, semi-major axis, semi-minor axis	6.ESS.3	- Compare and contrast the Earth, its moon, and other planets in the solar system, including comets and asteroids. (Comparisons should be made in regard to size, surface features, atmospheric characteristics, and the ability to support life.)	Systems and system models, Scale, proportion, and quantity	Developing and using models, Analyzing and interpreting data, Math and computational thinking	
6.2	Can you develop a scaled model based on a scaled drawing?	Students develop plan view and side view scale models of the solar system on graph paper using their calculated values from 6.1.	- Develop a scale model of the solar system. - Understand the concepts of plan view and side view. - Use a scale model of the solar system to explore relationships among the Sun and planets.	1.5	Orbital inclination, plane	6.ESS.3	- Compare and contrast the Earth, its moon, and other planets in the solar system, including comets and asteroids. (Comparisons should be made in regard to size, surface features, atmospheric characteristics, and the ability to support life.)	Systems and system models, Scale, proportion, and quantity	Developing and using models, Analyzing and interpreting data, Math and computational thinking	

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Lessoon	Focus Question	Description	Objective(s)	number of classes	Vocabulary	IN #	Standard Text	Cross Cutting Concept(s)	Practices	Notes
7.1	What is the difference between weight and mass? How does mass and the radius of an object affect it's weight?	Students examine a table of data to compare the weight of an object on different planets with respect to planet mass and radius and construct simple graphs of these results. Students are asked to use their graphs as evidence and provide reasoning to support claims about the effects of mass and radius on gravity.	- Construct graphs from planetary data. - Analyze and intepret graphical evidence to construct scientific explanations about surface gravity.	1.5-2	gravity, radium, mass, surface gravity, weight, correlation	6.ESS.1 6.ESS.3	- Compare and contrast the Earth, its moon, and other planets in the solar system, including comets and asteroids. (Comparisons should be made in regard to size, surface features, atmospheric characteristics, and the ability to support life.) -Describe the role of gravity and inertia in maintaining the regular and predictable motion of celestial bodies.	Systems and system models, Cause and Effect	Developing and using models, Analyzing and interpreting data, Math and computational thinking, Constructing explanations, Engaging in argument from evidence	
8.1	What is the relationship between mass and orbital period of a planet?	Students use a model to investigate the relationship between mass and orbital period.	- Use a model to study the relationship between relative body mass and the speed of an orbiting body.	1-1.5		6.ESS.1 6.ESS.3	- Compare and contrast the Earth, its moon, and other planets in the solar system, including comets and asteroids. (Comparisons should be made in regard to size, surface features, atmospheric characteristics, and the ability to support life.) -Describe the role of gravity and inertia in maintaining the regular and predictable motion of celestial bodies.	Systems and system models, Cause and Effect	Developing and using models, Constructing explanations, Engaging in argument from evidence	
8.2	What is the relationship between distance and mass of an orbiting body?	Students use a model to investigate the relationship between distance and mass of an orbiting body. There's also the opportunity to read an article expanding on gravity and the formation of galaxies, stars, and other bodies of the universe.	- Use a model to study the relationship between relative body mass, distance, and the speed of an orbiting body. - Construct and analyze scatterplots using data about Jupiter's moons.	1	Galaxy, nebula	6.ESS.1 6.ESS.3	- Compare and contrast the Earth, its moon, and other planets in the solar system, including comets and asteroids. (Comparisons should be made in regard to size, surface features, atmospheric characteristics, and the ability to support life.) -Describe the role of gravity and inertia in maintaining the regular and predictable motion of celestial bodies.	Systems and system models, Cause and Effect	Developing and using models, Constructing explanations, Engaging in argument from evidence	

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Lessoon	Focus Question	Description	Objective(s)	number of classes	Vocabulary	IN #	Standard Text	Cross Cutting Concept(s)	Practices	Notes
9.1	**How do you analyze satellite photographs to calculate size of various surface features?**	**Students use satellite photographs to calculate the approximate size canyons, channels, fossil fans, and gullies on Mars and Earth**	**- Analyze and interpret images to determine the scale properties of surface feature on Mars. -Use different measurements to determine size of objects in photographs. - Compare the relative sizes of surface features on Mars and Earth.**	**2**	**Alcove, apron, gully, sediment**	6.ESS.3	- Compare and contrast the Earth, its moon, and other planets in the solar system, including comets and asteroids. (Comparisons should be made in regard to size, surface features, atmospheric characteristics, and the ability to support life.)	**Scale, proportion, and quanity**	**Analyzing and interpreting data, Using math and computational thinking, Constructing explanations**	
10.1	Do you think humans should inhabit space or other planets? Why or why not?	Students discuss the pros and cons to living in space and construct an argument for or against space habitation.	- Develop an argument using supportive facts, for or against human habitation in space or on other planets.	1	Ethics	6.ESS.3 6-8 E.1-E.4 (look at Engineering tab)	- Compare and contrast the Earth, its moon, and other planets in the solar system, including comets and asteroids. (Comparisons should be made in regard to size, surface features, atmospheric characteristics, and the ability to support life.)	Systems and system models, Connections to engineering, technology and applications of science	Asking questions and defining problems, Engaging in argument from evidence, Analyzing and interpreting data, Developing and using models	
10.2	Can you list reasons why humans could not inhabit Mars? Can you design for criteria that would ensure human survival on Mars?	Students determine the criteria and constraints for human habitation on Mars. Students will be assigned one or two criteria to focus on.	- Define criteria and constraints that a design for human habitation of Mars must meet to ensure Astronaut's survival. - Develop design ideas for addressing specific criteria.	1	Constraint, criteria	6.ESS.3 6-8 E.1-E.4 (look at Engineering tab)	- Compare and contrast the Earth, its moon, and other planets in the solar system, including comets and asteroids. (Comparisons should be made in regard to size, surface features, atmospheric characteristics, and the ability to support life.)	Systems and system models, Connections to engineering, technology and applications of science	Asking questions and defining problems, Engaging in argument from evidence, Analyzing and interpreting data, Developing and using models	

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Lessoon	Focus Question	Description	Objective(s)	number of classes	Vocabulary	IN #	Standard Text	Cross Cutting Concept(s)	Practices	Notes
10.3	Can you design a habitat should humans inhabit Mars? Provide feedback to others' designs.	Students design and draw a model of a possible Mars habitat. They also provide feedback to others about their design plans.	- Plan and design a model with solutions to meet each of the criterion of the design problem. - Create and use feedback to evaluate design solutions.	1	Feedback	6.ESS.3 6-8 E.1-E.4 (look at Engineering tab)	- Compare and contrast the Earth, its moon, and other planets in the solar system, including comets and asteroids. (Comparisons should be made in regard to size, surface features, atmospheric characteristics, and the ability to support life.)	Systems and system models, Connections to engineering, technology and applications of science	Asking questions and defining problems, Engaging in argument from evidence, Analyzing and interpreting data, Developing and using models	Encourage reflection after 10.3 in which students take feedback and use it to improve designs.

ISI 6th grade curriculum map
Physical Science

STC: Energy, Force, and Motion

Lesson	Focus Question	Description	Objective(s)	number of classes	Vocabulary	IN #	Standard Text	Cross Cutting Concept(s)	Practices	Notes
2.1	Will a ball move at a constant speed if tapped?	Students predict whether a ball will move at a constant speed after it is tapped. They conduct a qualitative experiment to test their prediction. After a reading, they run a quantitative experiment to test their prediction. They can also read *Reference Frames* when done.	- Measure the speed and average speed of an object in motion. - Analyze and interpret data. - Describe the motion of an object, and explain how your frame of reference plays a part in that.	2	Force, mass, predict, speed, acceleration, average speed, reference frame, velocity	6.PS.1 6.PS.2	-Distinguish between the terms position, distance, and displacement, as well as, the terms speed and velocity. -Describe the motion of an object graphically showing the relationship between time and position.	Cause and effect, Connections to engineering, technology and science	Asking questions and defining problems, Planning and carrying out investigations, Analyzing and interpreting data	
2.2	What happens to the balls motion when on different surface types?	Students read *Forces and Motion* and apply what they learn to conduct an investigation on the forces acting on a ball moving on two different surface areas. Students develop force diagrams to show the forces acting on the ball.	- Measure the speed and average speed of an object in motion across a flat surface. - Investigate how forces affect an object's motion. - Analyze and interpret data from investigations on motion. - Employ force diagrams to model forces acting on an object.	1	Balanced forces, diagram, force, net force	6.PS.1 6.PS.2	-Distinguish between the terms position, distance, and displacement, as well as, the terms speed and velocity. -Describe the motion of an object graphically showing the relationship between time and position.	Cause and effect, Connections to engineering, technology and science	Asking questions and defining problems, Planning and carrying out investigations, Analyzing and interpreting data	
2.3	How does the mass affect the speed of the ball when forces are constant?	Students conduct an investigation on the effect of the ball's mass on its speed when forces acting on the ball are held constant.	- Plan and carry out an investigation. -Analyze and interpret data.	1	Gravity, mass, speed, variable	6.PS.1 6.PS.2	-Distinguish between the terms position, distance, and displacement, as well as, the terms speed and velocity. -Describe the motion of an object graphically showing the relationship between time and position.	Cause and effect, Connections to engineering, technology and science	Asking questions and defining problems, Planning and carrying out investigations, Analyzing and interpreting data	
2.4	How does speed of a ball change when rolled up an inclined plane?	Students predict how the speed of the ball will change as it is rolled up or down an inclined plane.	- Students view evidence for acceleration due to gravity.	1	Acceleration, average speed, predict, speed	6.PS.1 6.PS.2	-Distinguish between the terms position, distance, and displacement, as well as, the terms speed and velocity. -Describe the motion of an object graphically showing the relationship between time and position.	Cause and effect, Connections to engineering, technology and science	Asking questions and defining problems, Planning and carrying out investigations, Analyzing and interpreting data	

ISI 6th grade curriculum map
Physical Science

STC: Energy, Force, and Motion

Lesson	Focus Question	Description	Objective(s)	number of classes	Vocabulary	IN #	Standard Text	Cross Cutting Concept(s)	Practices	Notes
2.5	What is the different between mass and weight?	Students read *The Difference Between Mass and Weight* and applied what they learned to plan an investigation to analyze the relationship between mass and weight. Students analyze a graph of mass vs weight to determine how mass and weight are related.	- Describe how mass and weight are related. - Construct and analyze data tables and graphs describing the relationship between mass and weight.	1	Acceleration, diagram, force, mass, speed	6.PS.1 6.PS.2	-Distinguish between the terms position, distance, and displacement, as well as, the terms speed and velocity. -Describe the motion of an object graphically showing the relationship between time and position.	Cause and effect, Connections to engineering, technology and science	Asking questions and defining problems, Planning and carrying out investigations, Analyzing and interpreting data	
8.1	How do the three laws of motion play a role in roller coasters?	Students discuss how roller coasters show Newton's three laws of motion. Students build a model to discuss the energy of a passenger car travelling on a roller coaster. Students build a basic roller coaster and conduct investigations using it.	- Define and investigate relevant scientific principles inherent to the design of a marble rolling coaster	2-3	Kinetic energy, potential energy, dependent variable, energy transformation, independent variable, system	6-8 E.1-E.4	(look at Engineering tab)	Systems and system models, Energy and matter	Asking questions and defining problems, Developing and using models, Planning and carrying out investigations, Obtaining, evaluating and communicating information.	
8.2	Can you build a roller coaster and achive either the highest velocity, largest loop, or highest hill?	Students read and discuss how prototypes help ensure a successful design. Students design, construct, and test a roller coaster to achieve one of three design challenges: highest velocity, largest loop, or highest hill. Students analyze data to determine similarities and differences among severl design solutions.	-Apply understanding of energy, forces, and motion to construct a roller coaster. - Collect and use data to evaluate competing designs. -Use engineering processes to test and refine roller coaster design for optimization.	3	Constraints, criteria, modification, optimization, and prototype	6-8 E.1-E.4	(look at Engineering tab)	Systems and system models, Energy and matter	Asking questions and defining problems, Developing and using models, Planning and carrying out investigations, Obtaining, evaluating and communicating information.	

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Lesson	Focus Question	Description	Objective(s)	number of classes	Vocabulary	IN #	Standard Text	Cross Cutting Concept(s)	Practices	Notes
9	Can you design a vehicle solution so that produce does not fall off while being transported?	Students participate in a unit review session and are introduced to the performance assessment. Students create a prototype for produce transportation and predict what will happen to plastic fruit. Students work in groups to construct an explanation and design a solution for transportation of produce without it falling off the vehicle. Students create models, test their designs, and explain to classmates how their design will address the problem while receiving feedback.	- Using knowledge of energy, forces, and motion, create a plan for transporting produce without it falling off the vehicle.	2-3	N/A	6-8 E.1-E.4	(look at Engineering tab)	Patterns, Cause and effect, Scale, proportion, and quantity, Systems and system models, Energy and matter, Structure and function, Stability and change, Connections to engineering, technology and applications of science.		

ISI 6th grade curriculum map
Engineering

STC: Electricity, Waves, and Information Transfer

STC EWIT	Focus Question	Description	Objective(s)	# of Sessions	Vocabulary	IN #	Standard Text	Cross Cutting Concept(s)	Practices	Notes
3.1	How is the transfer of thermal energy from electric devices regulated?	Students begin by learning about the differences between thermal energy, temperature, and heat. They learn about various lightbulb designs. Students will plan and conduct an investigation to produce data that helps students draw conclusions about thermal energy transfer. Students will distinguish between energy transformation and energy transfer.	- There are different types of lightbulbs for different uses. - Lightbulbs transform electrical energy into light energy and thermal energy. - Thermal energy from lightbulbs transfer to surrounding air and may result in an increase in temperature.	1-1.5	energy transfer, energy transformation, heat, kinetic energy, temperature, thermal energy	6.PS.3	**Describe how potential and kinetic energy can be transferred from one form to another.**	Cause and effect, Energy and matter	Defining problems, Planning and carrying out an investigation, Analyzing and interpreting data, Using mathematics and computational thinking, Engaging in argument from evidence, Obtaining, evaluation, and communicating information	
3.2	How is the transfer of thermal energy from electric devices regulated?	Design and build a device that either maximizes or minimizes the transfer of thermal energy to the surroundings.	- Thermal energy in an electrical system can be regulated by different system components. - The process of engineering design is used to identify the ideal components for meeting the design goal.	1 +reflection	Filament, incandescent, modify, optimize, law of conservation of energy	6.PS.3	**Describe how potential and kinetic energy can be transferred from one form to another.**	Cause and effect, Energy and matter	Defining problems, Planning and carrying out an investigation, Analyzing and interpreting data, Using mathematics and computational thinking, Engaging in argument from evidence, Obtaining, evaluation, and communicating information	
5.1	How can we use models to understand wave properties?	Students begin by modelling transverse waves and understanding the properties of waves while being able to describe them quantitatively. Students will identify the relationship between frequency and wavelength, and between amplitude and wave energy in a transverse wave. Students will describe how the properties of waves in different parts of the electromagnetic spectrum differ.	- Wavelengths of transverse waves is the distance between two congruent points. - Frequency measures the number of waves that pass a point per unit.	1	Tranverse wave, amplitude, color, crest, electromagnetic wave, frequency, hertz, transmit, trough, wavelength	6.PS.4	Investigate the properties of light, sound, and other energy waves and how they are reflected, absorbed, and transmitted through materials and space.	Patterns	Developing and using models, Using mathematics and computational thinking, Connections to nature of science	

ISI 6th grade curriculum map
Engineering

STC: Electricity, Waves, and Information Transfer

STC EWIT	Focus Question	Description	Objective(s)	# of Sessions	Vocabulary	IN #	Standard Text	Cross Cutting Concept(s)	Practices	Notes
5.2	How can we use models to understand wave properties?	Students use models to investigate longitudinal waves, their properties of waves while being able to describe them quantitatively. Students will identify the relationship between frequency and wavelength in a longitudinal wave.	- Longitudinal waves propogate by pressure changes or particle compression and rarefraction. - Wavelength of longitudinal waves is the difference between areas of compression and rarefraction. - Frequency measures the number of waves that pass a point per unit. - Sound wave frequency relates to pitch of sound.	.5 +reflection	Compression, decibel, longitudinal waves, mechanical wave, pitch, rarefraction	6.PS.4	Investigate the properties of light, sound, and other energy waves and how they are reflected, absorbed, and transmitted through materials and space.	Patterns	Developing and using models, Using mathematics and computational thinking, Connections to nature of science	
6.1	How do waves behave when they interact with matter?	Intro: Observe how light and sound waves interact with matter. Make observations about dispersion of light. Make observations of refraction of light.	- Models are used to study the properties of waves. - Sound waves are transmitted through air and solids. - Lenses produce images by focusing light. - Convex lenses produce inverted real images and upright virtual images.	1.5 with intro	convex, lens, medium	6.PS.4	Investigate the properties of light, sound, and other energy waves and how they are reflected, absorbed, and transmitted through materials and space.	Structure and function	Developing and using models, Engaging in argument with evidence, Constructing explanations	
6.2	How do waves behave when they interact with matter?	Make observations of absorption and transmission of light waves. Model how light waves interact with matter. Construct an explanation about the interaction of light waves with different materials.	-Objects can be classified by the way they interact with light; transparent, transluscent, and opaque.	0.5	opaque, transluscent, transparent	6.PS.4	Investigate the properties of light, sound, and other energy waves and how they are reflected, absorbed, and transmitted through materials and space.	Structure and function	Developing and using models, Engaging in argument with evidence, Constructing explanations	
6.3	How do waves behave when they interact with matter?	Make observations about the reflection of light waves. Model how light waves interact with different types of matter.	-Light travels in striaght lines. -A mirror can divide the path of light into two parts.	1	incident ray, reflect, reflected ray	6.PS.4	Investigate the properties of light, sound, and other energy waves and how they are reflected, absorbed, and transmitted through materials and space.	Structure and function	Developing and using models, Engaging in argument with evidence, Constructing explanations	
6.4	How do waves behave when they interact with matter?	Make observations about the transmission, absorption, and reflection of sound waves. Model how sound waves interact with different types of matter.	- Sound waves require matter for their submission. - Sound waves are transmitted through, absorbed by, or reflected by variou materials.	.5 +reflection		6.PS.4	Investigate the properties of light, sound, and other energy waves and how they are reflected, absorbed, and transmitted through materials and space.	Structure and function	Developing and using models, Engaging in argument with evidence, Constructing explanations	

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7.1	How do we use waves to encode and transmit information?	Students start out by developing and using a code to transmit information with light waves. Then they compare analog and digital signals. Students will understand how parts of a CD player work together to decode digitized information. Lastly they develop how a song stored on a CD could be heard by a listener.	- Analog signals carry information in wave characteristics. - Digital signals cary information in binary code. - CDs use lasers and computers to decode digital data stored on the discs.	.5-1 with intro	analog, digital	6.PS.4	Investigate the properties of light, sound, and other energy waves and how they are reflected, absorbed, and transmitted through materials and space.	Structure and function, Patterns, Connections to nature of science	Obtaining, evaluating, and communicating information, Developing and using models, Constructing explanations and designing solutions.	
7.2	How do we use waves to encode and transmit information?	Students investigate how light travels through optical fibers.	- Optical fiber is designed to transmit light waves.	0.5	optical fiber	6.PS.4	Investigate the properties of light, sound, and other energy waves and how they are reflected, absorbed, and transmitted through materials and space.	Structure and function, Patterns, Connections to nature of science	Obtaining, evaluating, and communicating information, Developing and using models, Constructing explanations and designing solutions.	
7.3	How do we use waves to encode and transmit information?	Students will develop and use a code to transmit information using light waves.	- A solution needs to be tested and then modified on the basis of the test results in order to improve it.	1 +reflecito n		6.PS.4	Investigate the properties of light, sound, and other energy waves and how they are reflected, absorbed, and transmitted through materials and space.	Structure and function, Patterns, Connections to nature of science	Obtaining, evaluating, and communicating information, Developing and using models, Constructing explanations and designing solutions.	
8.1	How are the properties of electromagnetic waves useful for human communication systems, such as a Global Positioning System?	Intro: Students use a model to understand and explain how wave amplitude and frequency can be used to encode information. Then students will identify the function of components of GPS. Use a model to understand how GPS identifies the location of a receiver on Earth's surface.	- Changes in wave amplitude and frequency can encode information. - Different parts of communication systems work together for encoding, transmitting, and decoding information. - The transmission of radio waves from at least four GPS satellites to an individual receiver helps determine the exact location of that receiver on Earth.	1	Global positioning system (GPS)	6.PS.4	Investigate the properties of light, sound, and other energy waves and how they are reflected, absorbed, and transmitted through materials and space.	Structure and function,Connection s to nature of science, Connections to STEM	Developing and using models, Constructing explanations, Connections to the nature of science	

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Engineering

STC: Electricity, Waves, and Information Transfer

STC EWIT	Focus Question	Description	Objective(s)	# of Sessions	Vocabulary	IN #	Standard Text	Cross Cutting Concept(s)	Practices	Notes
8.2	How are the properties of electromagnetic waves useful for human communication systems, such as a Global Positioning System?	Students use a model to understand and make predictions about how the GPS identifies the location of a receiver on Earth's surface.	- A model can be used to understand and make predictions about how the parts of a system work together. - The GPS is based on trilateration.	1 +reflection	Global, seismographic, network, satellite, seismic activity, sensor	6.PS.4	Investigate the properties of light, sound, and other energy waves and how they are reflected, absorbed, and transmitted through materials and space.	Structure and function,Connections to nature of science, Connections to STEM	Developing and using models, Constructing explanations, Connections to the nature of science	